



# Amodel<sup>®</sup> AS-4133 HS

polyphthalamide

Amodel AS-4133 HS is a 33% glass reinforced, lubricated, heat stabilized grade of polyphthalamide (PPA) that offers fast cycle times and moldability in hot water molds. Typical applications include electrical and electronic components especially for automotive systems.

- Black: AS-4133 HS BK 324
- Natural: AS-4133 HS NT

## General

Material Status	• Commercial: Active		
Availability	• Africa & Middle East • Asia Pacific	• Europe • North America	• South America
Filler / Reinforcement	• Glass Fiber Reinforcement, 33% Filler by Weight		
Additive	• Heat Stabilizer	• Lubricant	• Mold Release
Features	• Fast Molding Cycle • Good Chemical Resistance • Good Creep Resistance • Good Dimensional Stability	• Good Stiffness • Heat Stabilized • High Heat Resistance • High Strength	• Hot Water Moldability • Laser Weldable • Low Moisture Absorption • Lubricated
Uses	• Automotive Applications • Automotive Electronics • Automotive Under the Hood • Cell Phones • Connectors	• Electrical/Electronic Applications • General Purpose • Industrial Applications • Industrial Parts • Lawn and Garden Equipment	• Machine/Mechanical Parts • Metal Replacement • Thick-walled Parts • Valves/Valve Parts
RoHS Compliance	• RoHS Compliant		

## General

Automotive Specifications	• ASTM D4000 PA102 G35 Color: BK324 Black
	• ASTM D4000 PA102 G35 Color: NT Natural
	• ASTM D4000 PPA0121 G34 GB145 KD170 KN100 PN060 YI285 Color: BK324 Black
	• ASTM D4000 PPA0121 G34 GB145 KD170 KN100 PN060 YI285 Color: NT Natural
	• BOSCH N28 BN05-OX2 Color: BK324 Black
	• BOSCH N28 BN05-OX2 Color: NT Natural
	• CHRYSLER MS-DB478 Type A CPN3598 Color: BK Black
	• CHRYSLER MS-DB478 Type A CPN3972 Color: Natural
	• DELPHI M-2396 Color: BK
	• DELPHI M-2396 Color: BK324 Black
	• DELPHI M-2396 Color: BU474 Blue
	• DELPHI M-2396 Color: NT Natural
	• DELPHI M-53291 Color: BU474 Blue
	• DELPHI M-53293 Color: BK324 Black
	• DELPHI M-53293 Color: NT Natural
	• DELPHI M-6081 Color: NT Natural
	• DELPHI M-6083 Color: BK324 Black
	• GM GMP.PPA.002 Color: BK324 Black
	• GM GMP.PPA.002 Color: NT Natural
	• ISO 1874 PA6T/66, MH, 12-120, GF33 Color: BK324 Black
• ISO 1874 PA6T/66, MH, 12-120, GF33 Color: NT Natural	
• TORRINGTON T-456 Color: BK324 Black	
• TRW S-13972700 Color: BK324 Black	
• TRW S-13972700 Color: NT Natural	
• TYCO 100-1392 Color: BK324 Black	
• TYCO 100-1392 Color: NT Natural	
• YAZAKI YPES-25-02-306 Color: BK324 Black	
• YAZAKI YPES-25-02-306 Color: NT Natural	
Appearance	• Black • Natural Color
Forms	• Pellets
Processing Method	• Water-Heated Mold Injection Molding

Physical	Dry	Conditioned Unit	Test Method
Density	1.45	-- g/cm <sup>3</sup>	ISO 1183/A
Molding Shrinkage			ASTM D955
Flow	0.50	-- %	
Across Flow	1.0	-- %	
Water Absorption (24 hr)	0.29	-- %	ASTM D570
Mechanical	Dry	Conditioned Unit	Test Method
Tensile Modulus			
--	11700	11700 MPa	ASTM D638
23°C	12600	-- MPa	ISO 527-2
100°C	6830	-- MPa	ISO 527-2
150°C	5310	-- MPa	ISO 527-2
175°C	4830	-- MPa	ISO 527-2
Tensile Stress			
Break, 23°C	211	-- MPa	ISO 527-2
Break, 100°C	125	-- MPa	ISO 527-2
Break, 150°C	87.6	-- MPa	ISO 527-2
Break, 175°C	79.3	-- MPa	ISO 527-2

Mechanical	Dry	Conditioned Unit	Test Method
--	200	172 MPa	ASTM D638
Tensile Elongation			
Break	2.5	2.2 %	ASTM D638
Break, 23°C	2.6	-- %	ISO 527-2
Break, 100°C	4.3	-- %	ISO 527-2
Break, 150°C	6.6	-- %	ISO 527-2
Break, 175°C	6.6	-- %	ISO 527-2
Flexural Modulus			
--	11000	11000 MPa	ASTM D790
23°C	10400	-- MPa	ISO 178
100°C	7170	-- MPa	ISO 178
150°C	4620	-- MPa	ISO 178
175°C	4210	-- MPa	ISO 178
Flexural Strength			
--	290	241 MPa	ASTM D790
23°C	296	-- MPa	ISO 178
100°C	177	-- MPa	ISO 178
150°C	111	-- MPa	ISO 178
175°C	99.3	-- MPa	ISO 178
Compressive Strength	179	172 MPa	ASTM D695
Shear Strength	89.6	75.8 MPa	ASTM D732
Poisson's Ratio	0.41	--	ASTM E132
Impact	Dry	Conditioned Unit	Test Method
Charpy Notched Impact Strength (23°C)	11	-- kJ/m <sup>2</sup>	ISO 179/1eA
Charpy Unnotched Impact Strength (23°C)	67	-- kJ/m <sup>2</sup>	ISO 179/1eU
Notched Izod Impact			
--	80	69 J/m	ASTM D256
23°C	9.7	-- kJ/m <sup>2</sup>	ISO 180/1A
Unnotched Izod Impact			
--	960	-- J/m	ASTM D256
23°C	59	-- kJ/m <sup>2</sup>	ISO 180/1U
Thermal	Dry	Conditioned Unit	Test Method
Deflection Temperature Under Load			
0.45 MPa, Annealed, 3.20 mm	320	-- °C	ASTM D648
1.8 MPa, Unannealed	294	-- °C	ISO 75-2/A
1.8 MPa, Annealed, 3.20 mm	300	-- °C	ASTM D648
Max. Continuous Use Temperature <sup>1</sup>	210	-- °C	ASTM D3045
Melting Temperature	327	-- °C	ASTM D570 ISO 11357-3
CLTE			
Flow: 0 to 100°C	0.000020	-- cm/cm/°C	ASTM E831
Flow: 100 to 200°C	0.000015	-- cm/cm/°C	
Transverse: 0 to 100°C	0.000076	-- cm/cm/°C	
Transverse: 100 to 200°C	0.00012	-- cm/cm/°C	
Electrical	Dry	Conditioned Unit	Test Method
Volume Resistivity	2.0E+16	5.0E+14 ohm·cm	ASTM D257

Electrical	Dry	Conditioned Unit	Test Method
Dielectric Strength (1.60 mm)	20	20 kV/mm	ASTM D149
Dielectric Constant			ASTM D150
60 Hz	3.80	4.30	
1 MHz	3.60	3.40	
Dissipation Factor			ASTM D150
60 Hz	0.0040	0.020	
1 MHz	0.012	0.019	
Flammability	Dry	Conditioned Unit	Test Method
Flame Rating - UL <sup>2</sup> (3.20 mm)	HB	--	UL 94
UL 746	Dry	Conditioned Unit	Test Method
Comparative Tracking Index (CTI)	600	600 V	UL 746
High Voltage Arc Tracking Rate (HVTR)	14.0	18.0 mm/min	UL 746

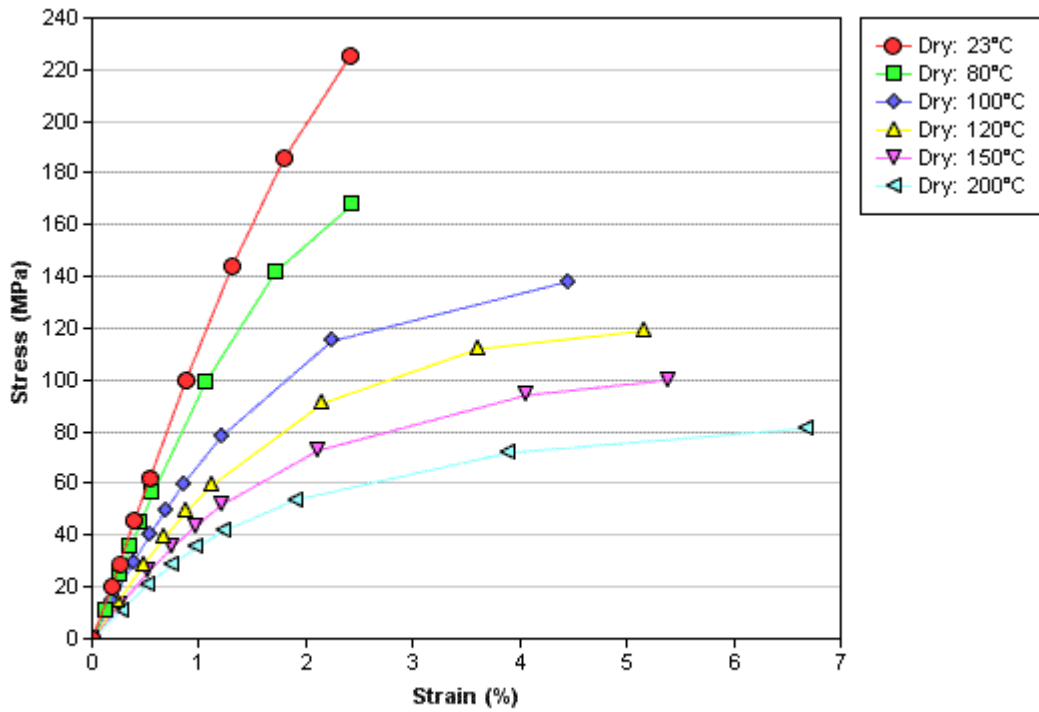
Injection	Typical Value	Unit
Drying Temperature	120	°C
Drying Time	4.0	hr
Suggested Max Moisture	0.045	%
Rear Temperature	318 to 324	°C
Front Temperature	327 to 332	°C
Processing (Melt) Temp	329 to 343	°C
Mold Temperature	65.6 to 93.3	°C

#### Injection Notes

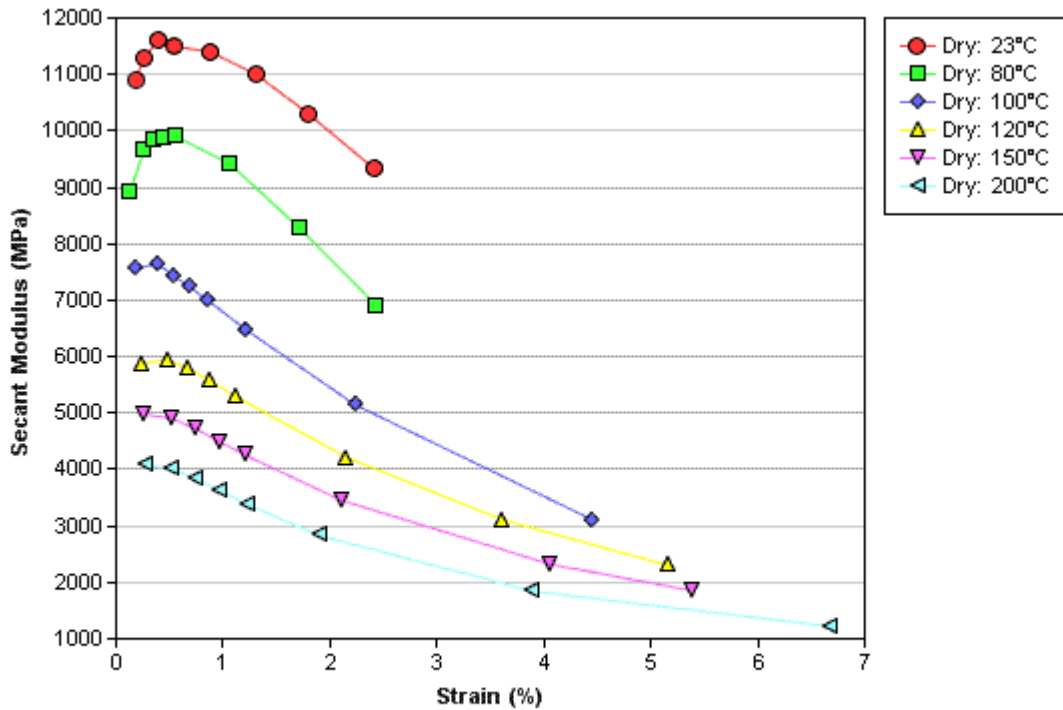
Injection Rate: 3 to 4 in/sec

Holding Pressure: 50% of injection pressure

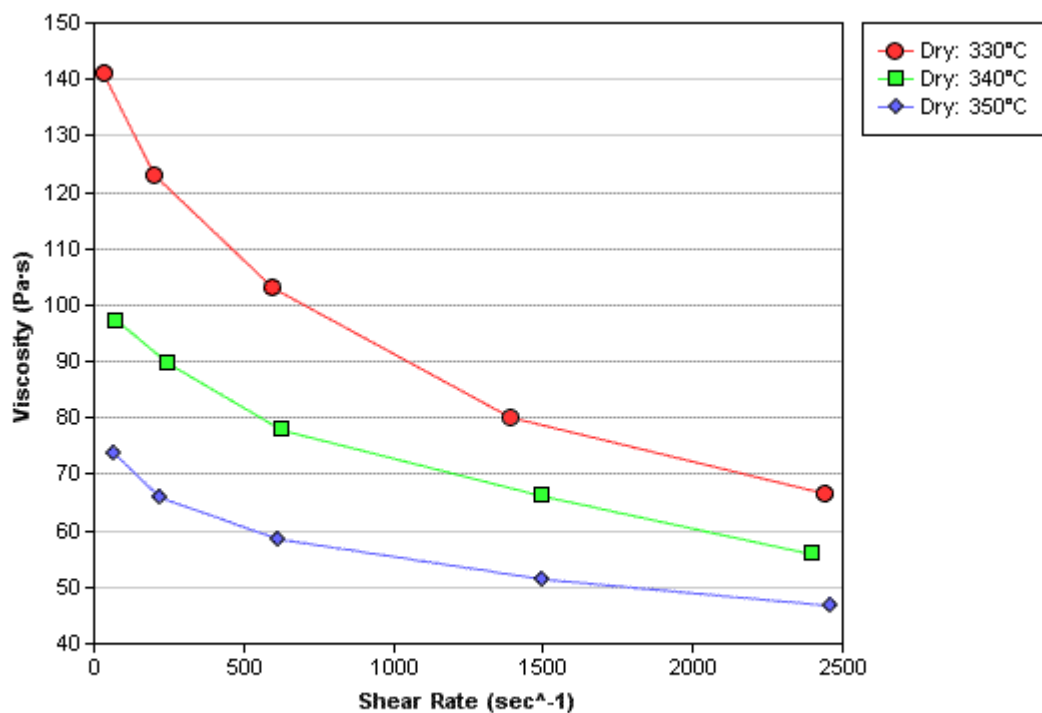
## Isothermal Stress vs. Strain (ISO 11403-1)



## Secant Modulus vs. Strain (ISO 11403-1)



## Viscosity vs. Shear Rate (ISO 11403-2)

**Notes**

Typical properties: these are not to be construed as specifications.

<sup>1</sup> 1500 hr

<sup>2</sup> These flammability ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

For assistance with an emergency involving products of Solvay Advanced Polymers, such as a spill, leak, fire, or explosion, call day or night:

#### Emergency Health Information

USA +1.800.621.4590

International +1.770.772.8577

#### Emergency Spill Information

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(CHEMTREC)

Europe +44 208.762.8322 (CARECHEM)

China +86.10.5100.3039

All other Asian countries +65.633.44.177

For additional product information, technical assistance, and Material Safety Data Sheets (MSDS), call:

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Property values for individual batches will vary within specification limits. Unless otherwise noted, values shown are typical for uncolored resin; colorants may alter values. For Preliminary Data Sheets, values are typical of limited production and specifications are not yet established.

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